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FOLLOW ON TESTING OF VACUUM MATTRESSES (NACHERPROBUNG VON VAKUU--ETC(U)  
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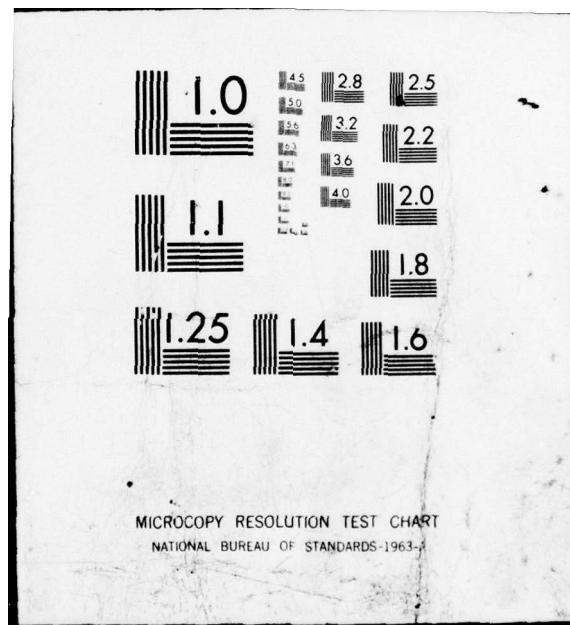
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Subject: Followon Testing of Vacuum Mattresses

References: 1. Academy for Medical Service and Sanitation of the  
Bundeswehr, Department for Studies and Science, Study  
Group for Medical Technology/Medical Supplies Ref.  
No. 90-65-15-25 of 16 July 1975  
2. BWB - BA IV 2 Ref. No. 90-65-15 of 11 August 1975  
3. Medical Office of the Bundeswehr III 2, Ref. No.  
90-65-15 of 19 August 1975

Inclosure: 1

On the basis of the reports of references 1 and 2, a followon test  
of the modified vacuum mattresses was arranged by the Medical Office of  
the Bundeswehr.

Three modified models were made available for the followon testing,  
by the BWB. These involved mattresses from the firms:

Laerdal, Model 2a (modified)

Firn, Model 3a (modified)

Soehngen, Model 4a (modified)

(Inclosure, Figures 1-3)

The model numbers were used as found in test report of reference 1.  
For appraisal and final discussions in Murnau, the participants were invited  
as with the first testing program.

**Participants:**

Medical Officer Field Forces		Divisional Medical Officer,
Dr. Grigoleit		First Mountain Division
LTC (Pharmacist)	Steinlechner	Divisional Pharmacist, First Mountain Division
LTC (MC)	Dr. Miesel	Chief, Air Force Medical Squadron LTG 61
Sergeant 1st Class	Klein	Air Rescueman, Air Force Medical Squadron LTG 61
Program Director	Dr. Probst	Medical Director, Accident Clinic, Murnau
	Dr. Ruidisch	Accident Clinic, Murnau
	Mr. Fischer	BWB - BA IV 2
LTC (Pharmacist)	Schell	Academy for Medical Service and Sanitation of the Bundes- wehr, Department for Studies and Science, Study Group Medi- cal Technology/Medical Supplies
LTC	Dengler	Academy for Medical Service and Sanitation of the Bundes- wehr, Department for Studies and Science, Study Group Medi- cal Technology/Medical Supplies

**Results of the followon testing:**

/2

M4a (Soehngen) (Inclosure, Figure 3)

The disturbing grips which had previously been either too narrow or too stiff (reference 1) on models 4 and 5 were modified into an encircling line as requested.

This vacuum mattress has nevertheless too little moldability owing to its box shape and the stiffer material and it tends to form creases. For these reasons, already mentioned in reference 1, model M4a is rejected.

M2a (Laerdal) (Inclosure, Figure 1)

This mattress was demonstrated as a modified model. In accordance with the requirement, the mattress was made wider and, instead of the stretcher loops, stretcher grips were worked into an encircling strip.

Advantages:

Width adequate,

Easier to carry with the new grips,

Good edge stability,  
Cover easy to change and wash.

Disadvantages:

Carrying grips on the encircling strap which is fastened not on the mattress but on the cover can easily be ripped; transverse straps would still in some cases be necessary,

Material and type of grips difficult to grasp,

Exchangeable cover can easily rip in case of damages,

Exchangeable cover cancels formation of creases in mattress,

Valves for deflating and inflating (in case of repairs) are not clearly designated (Figure 1a),

Filling is somewhat too thick.

The mattress M2a (Laerdal) is only recommended with restrictions. It is inferior to Model 3a.

M3a (Firm) (Inclosure, Figures 2, 4 and 5)

[Handwritten note: Selected for the Bundeswehr]

The model was partially modified in accordance with the requirements (reference 1, Inclosure, paragraph 2.27).

The valve was shifted to the side. It is used for deflating and inflating. The filler material was only slightly increased. Two further handgrips were additionally installed in the encircling line not quite at hipheight.

Advantages of Model M3a:

Simple, clear model,

Handgrips can be shifted as required on the encircling line and be increased; even without handgrips (garden hose segment), the line can be grasped at many points,

Good moldability at edges,

Easy to roll up owing to flat edge or to pile up in extended form or store rolled up.

Disadvantages:

Valve still too large and not shifted enough to the side,

Color orange on one side good for use in accidents but nevertheless to be rejected for use in the field.

In addition to the properties described here (advantages and disadvantages), see reference 1.

/3

In addition, tests were carried out using the model demonstrated to carry a casualty with mattress on the stretcher in various medical evacuation resources at especially unfavorable places. There resulted no difficulties.

Mattress Model 3a (Firn) was recommended for acceptance.

The model should nevertheless have a shorter valve which is still to be shifted about 5 cm further on the outer side. It should not have sharp edges but be possibly protected with an undetachable cap. The filler material should not be less than a full width but slightly greater. Likewise, carrying grips should be installed at head and foot, accordingly a total of 10 carrying grips (two each at the head, foot, head-shoulder height, hip-height and at the height of the leg below the knee).

Since the carrying grips can easily be shifted, the arrangement can be changed at any time.

A medium or dark gray is suggested as color for the mattress. Insofar as luminous and warning paints are required (SAR helicopters, emergency medical vehicles), a recognition factor is possible by sheets, covers, etc.

The pump should be able to be attached to the mattress using two straps not impeding the function of the mattress during storage and transport when empty.

#### Deflating Pumps

Two pumps were demonstrated (Figure 6):

- a. Soehngen type, modified model
- b. Laerdal type, Stiga, quicker, Art. No. 41-5111.

Owing to the simplicity, lesser size, good suction performance and possibility to deflate manually or with the feet, preference was given to Model b (Figure 7).

During the test without special load, the hollow plastic piston rod still broke (Figure 7/1). In addition, it was determined that the grip section of the pump is only butt-glued to the cylinder and was sealed with adhesive tape (Figure 7/2).

What is involved here is a relatively cheap finished product which is too susceptible for field conditions.

Basic acceptance is given a pump of the type of Model b. The pump should nevertheless be delivered from durable material without any special weak points.

The pump does not have to be suited for inflation for repairs. This can be done with compressed air or oxygen.

Summary

Model 4a (Soehngen) is rejected.

Model 2a (Laerdal) is only worth recommending with significant limitations.

Model 3a (Firn) is recommended for acceptance although a few slight modifications are still necessary.

No fully developed model of the pumps has yet been demonstrated. The type demonstrated by the firm Laerdal corresponds to some extent to the requirements in the type and form but not in material.

For

[Signature]

(Dr. Gurn)  
Colonel (MC)

Inclosure to letter

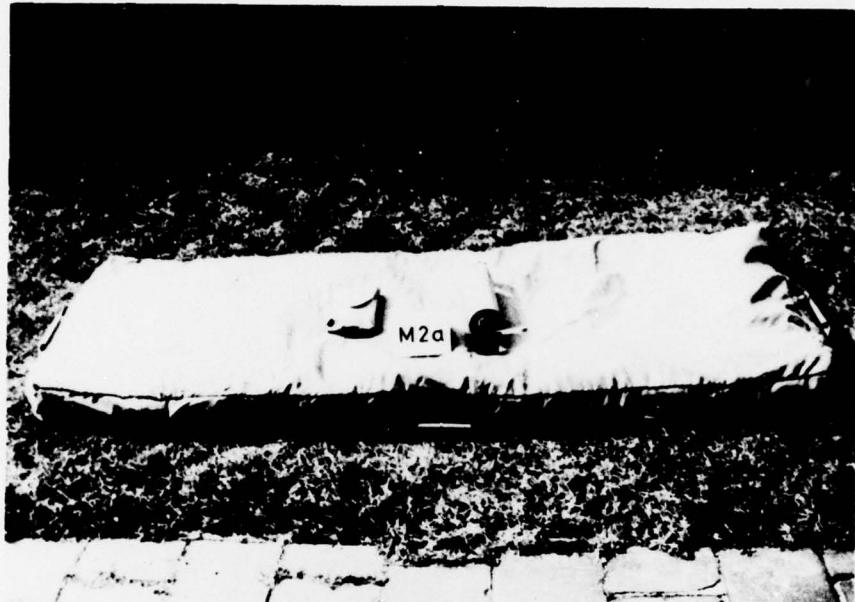
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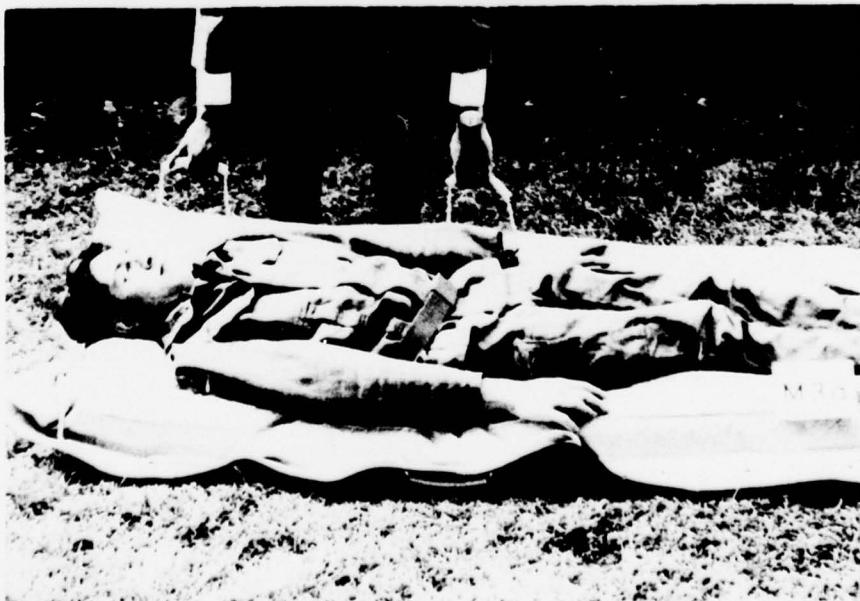


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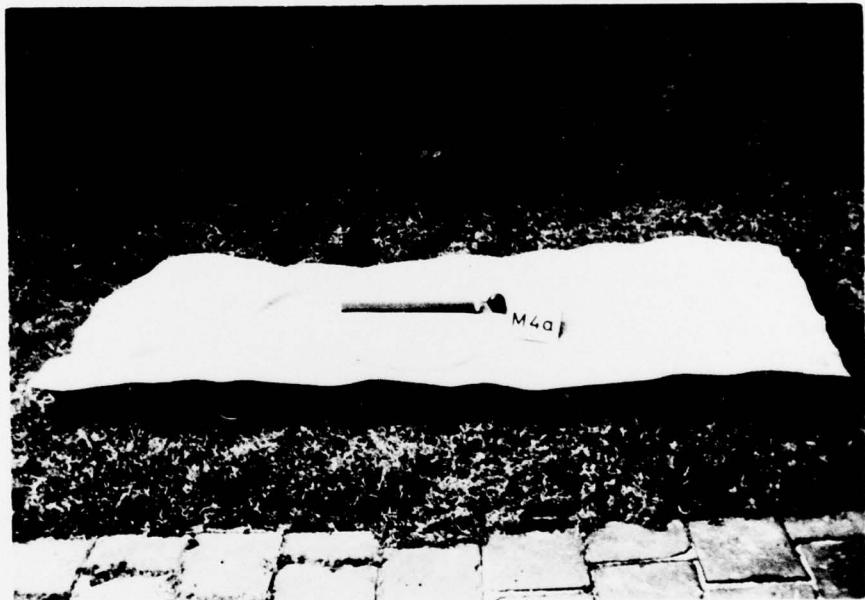


2a



2b

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3

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- 4 -

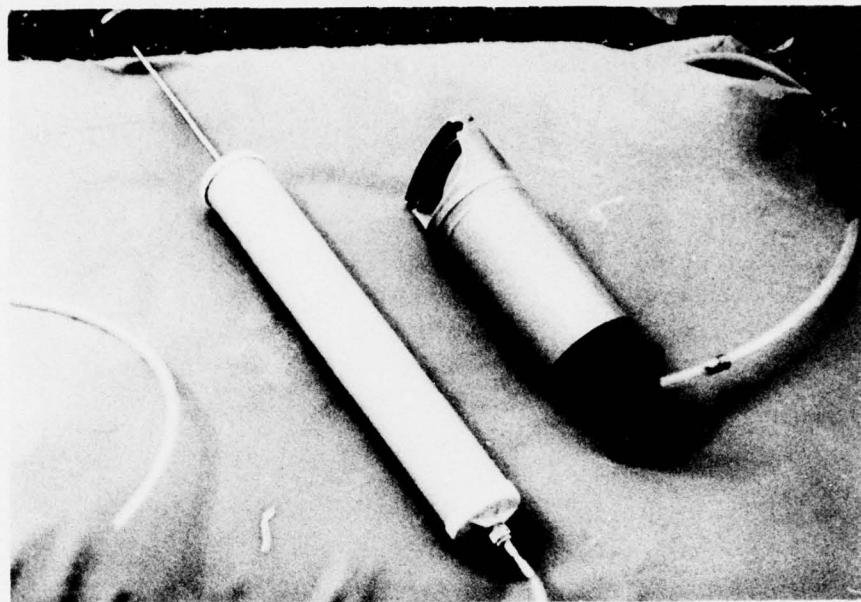


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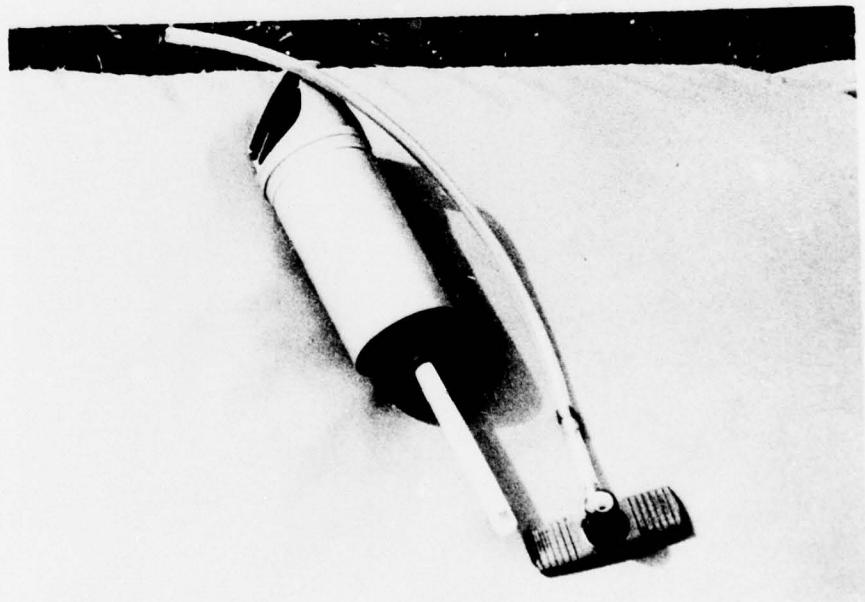


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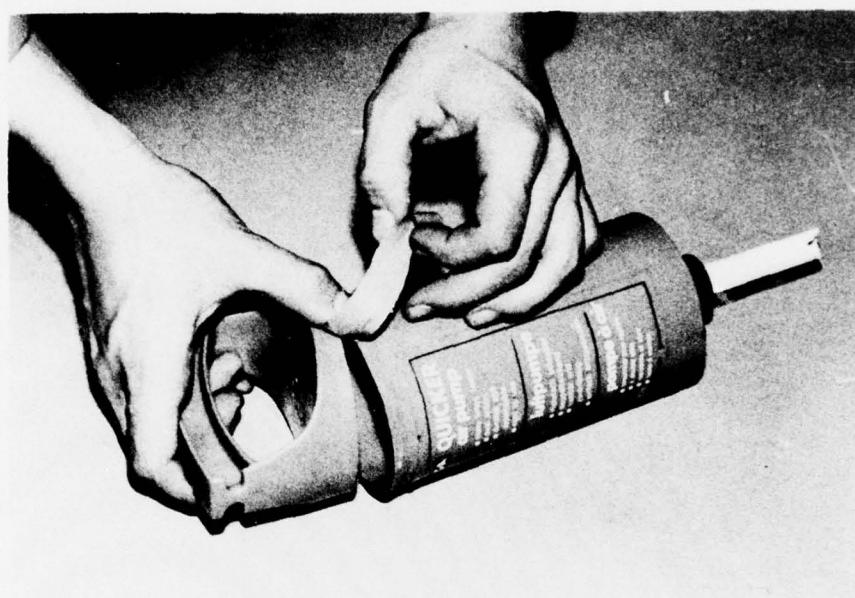
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